Unit 15.5 Day 5 p339-340: 34, 35, 40-49, 57, 58, 60-67

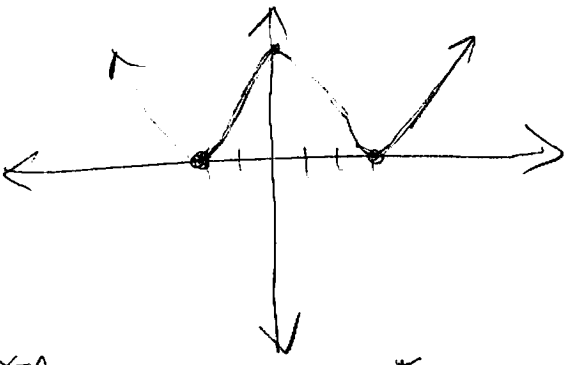
(34) $f(x) = (x+2)^2(x-3)^2$

$f(x) = (x^2+4x+4)(x^2-6x+9)$

$f(x) = x^4 - 6x^3 + 9x^2$
$+4x^3 - 24x^2 + 36x$
$4x^2 - 24x + 36$

$f(x) = x^4 - 2x^3 - 11x^2 + 12x + 36$

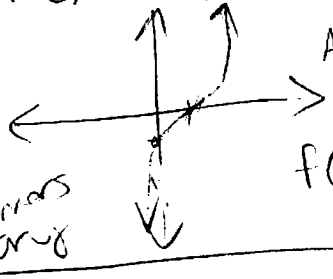
$f(0) = 36$



Answers vary

(35) $f(x) = (x-1)^3$

$f(x) = x^3 - 3x^2 + 3x - 1$



$f(0) = -1$

(40) 2

(41) 3

(42) C

(43) D

(44) E

(45) A

(46) B

(47) F

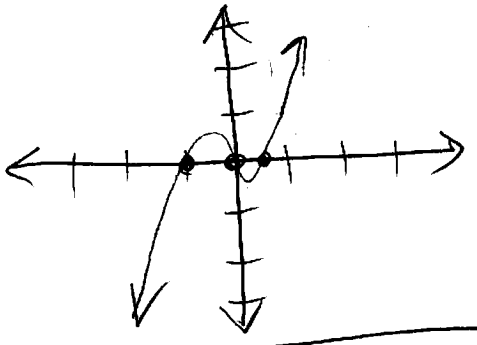
(48) a) $(-\infty, \infty)$
b) $(-\infty, \infty)$
c) ↙ ↑ left down, right up
d) max 7
e) max 6

(49) a) $(-\infty, \infty)$
b) $(-\infty, \infty)$
c) ↙ ↓ down down
d) max 6
e) max 5

(57) $f(x) = 2x^3 + x^2 - x$

$f(x) = x(2x^2 + x - 1)$

$f(x) = x(2x-1)(x+1)$



(58) $f(x) = x^4 - 3x^2 + 2$

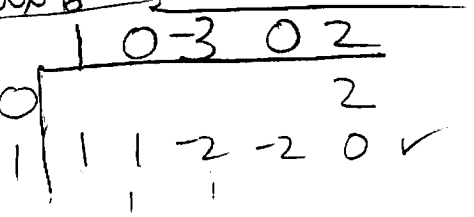
$f(x) = (x-1)(x^3 + x^2 - 2x - 2)$

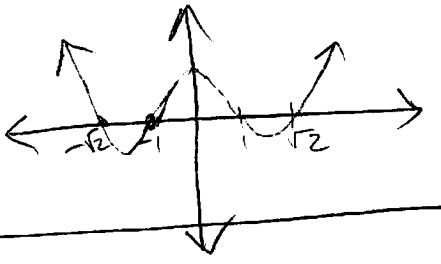
$f(x) = (x-1)[x^2(x+1) - 2(x+1)]$

$f(x) = (x-1)(x+1)(x^2-2)$

$x = -1, -1, \pm\sqrt{2}$

$f(0) = 2$





(60) $f(x) = \frac{4}{x-1}$

VA $x = 1$

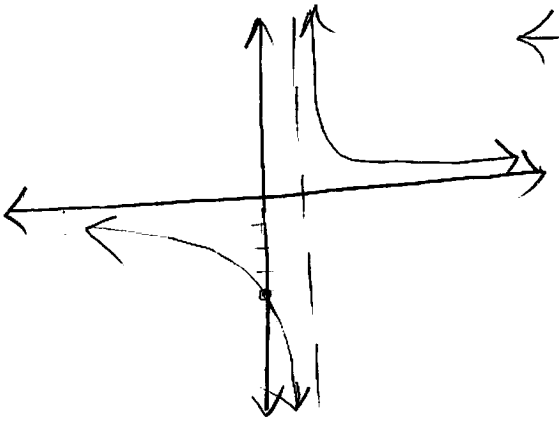
HA ~~$x = 0$~~

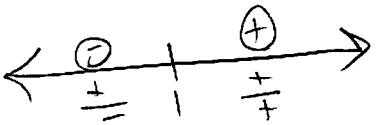
Cross? $0 = \frac{4}{x-1}$

NO $\neq 4$

x-int None

y-int $y = -4$
$(0, -4)$





(61) $f(x) = \frac{4x-2}{3x+1}$

VA $x = -\frac{1}{3}$

HA $y = \frac{4}{3}$

Cross? $\frac{4}{3} = \frac{4x-2}{3x+1}$

$12x+4 \neq 12x-6$

No

x-int

$0 = 4x-2$

$x = \frac{1}{2}$

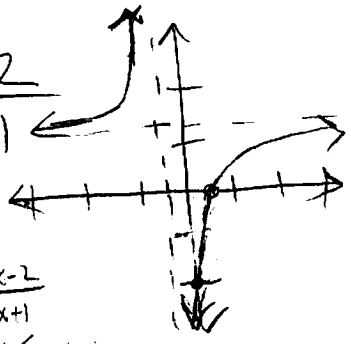
y-int

$f(0) = -2$

$(0,-2)$

$f(-1) = \frac{-4-2}{-3+1} = \frac{-6}{-2} = 3$

$(-1, 3)$



(62) $f(x) = \frac{6x}{(x-1)(x+2)}$

VA $x=1, x=-2$

HA $y=0$

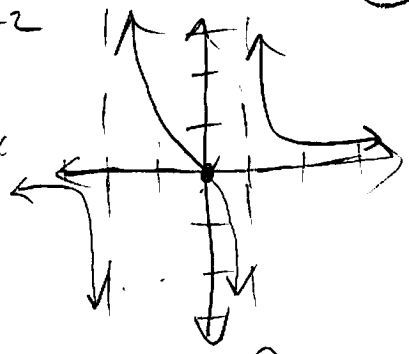
Cross? $0 = 6x$

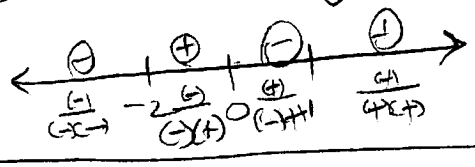
$0 = x$

Yes @ $(0,0)$

x-int $(0,0)$

y-int $(0,0)$





(63) $f(x) = \frac{2x}{x^2-1}$

VA $x = \pm 1$

HA $y = 0$

cross? $0 = 2x$

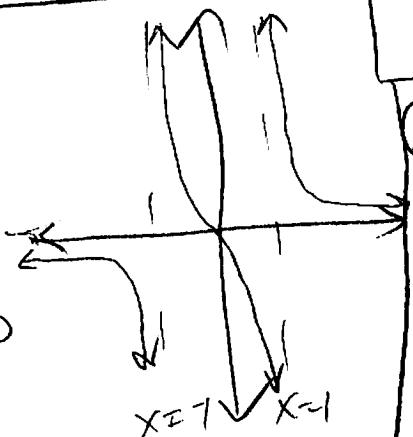
$0 = x$

Yes @ $(0,0)$

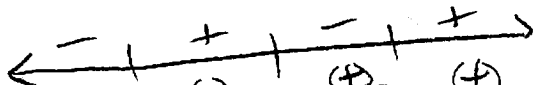
x-int $(0,0)$

y-int $f(0) = 0$

$(0,0)$



$\frac{2x}{(x-1)(x+1)}$



$f(-2) = -\frac{4}{3}$, $f(-\frac{1}{2}) = \frac{4}{3}$, $f(\frac{1}{2}) = -\frac{4}{3}$

(64) $f(x) = \frac{x^2+4}{x+2}$

VA $x = -2$

HA

$$\begin{array}{r|rrr} -2 & 1 & 0 & 4 \\ & & -2 & 4 \\ \hline & 1 & -2 & 8 \end{array}$$

$y = x - 2$

Cross? $x - 2 = \frac{x^2+4}{x+2}$

$x^2 - 4 \neq x + 4$

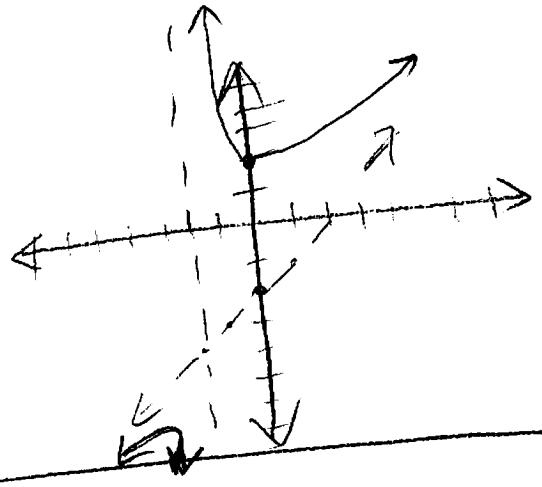
No

$f(0) = -2$

$(0,-2)$

$f(3) = \frac{9+4}{-1}$

$f(-3) = -13$



(65) $f(x) = \frac{x^2-1}{x}$

VA $x = 0$

HA

$$\begin{array}{r|rr} x & x & \\ \hline x & x^2 & +1 \\ & x^2 & \\ \hline & 1 & \end{array}$$

$y = x$

Cross?

$x = \frac{x^2-1}{x}$

$x^2 \neq x^2 - 1$

No

x-int

$0 = x^2 + 1$

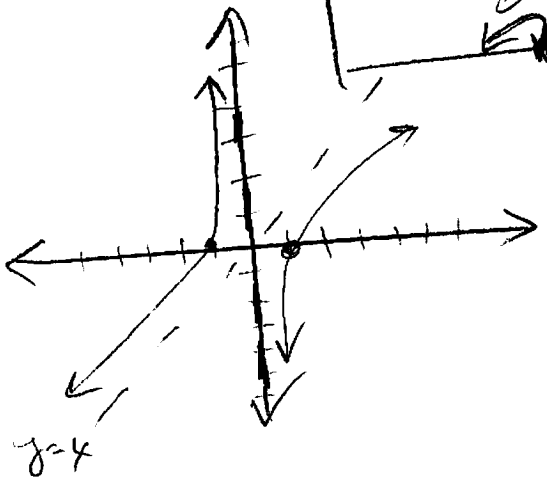
$x = \pm 1$

$(1,0), (-1,0)$

y-int

$f(0) = \phi$

None



(66) $f(x) = \frac{-2}{x^2+1}$

$x^2 = -1$

VA None

HA $y = 0$

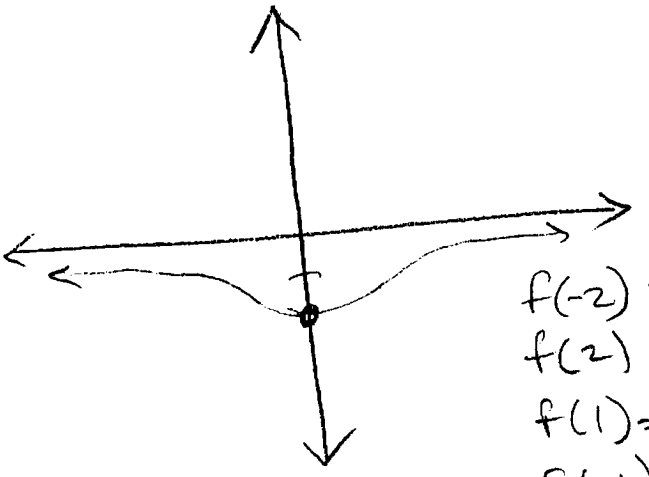
x-int None

y-int $f(0) = -2$
$(0, -2)$

cross $0 = \frac{-2}{x^2+1}$

$0 \neq -2$

No



$f(-2) = -\frac{2}{5}$

$f(2) = -\frac{2}{5}$

$f(1) = -1$

$f(-1) = -1$

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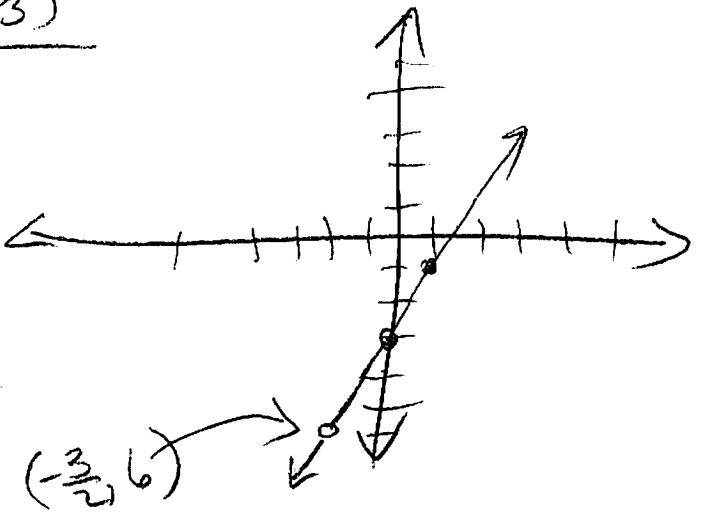
(67) $f(x) = \frac{4x^2-9}{2x+3} = \frac{(2x-3)(2x+3)}{2x+3}$

VA $x = -\frac{3}{2}$

HA After cancelling, no longer rational

Graph $y = 2x - 3$ w/ hole



$f(-\frac{3}{2}) = 2(-\frac{3}{2}) - 3$

$= -6$

$f(-\frac{3}{2}) = -6$